HIBBING COMMUNITY COLLEGE
COURSE OUTLINE

COURSE TITLE & NUMBER: Nitrous Oxide-Oxygen Inhalation Sedation: DAS 1582
CREDITS: 1 (0.5 LEC/ 0.5 LAB)
PREREQUISITES: DAS 1525 or be a Minnesota Licensed Dental Assistant or Minnesota Licensed Dental Hygienist / CPR – Health Care Provider

CATALOG DESCRIPTION:
Nitrous Oxide-Oxygen Inhalation Sedation provides the basic necessary information on inducing and monitoring nitrous oxide analgesia and the skills necessary to handle patients and equipment in a clinical setting.

OUTLINE OF MAJOR CONTENT AREAS:
1. MN Board Rules on Nitrous Oxide Analgesia
   A. Levels of supervision
      1. General
      2. Indirect
      3. Direct
   B. Requirements
   C. Liability Insurance
2. History of N2O Use
   A. Dr. Horace Wells
   B. ADA Standards of inhalation equipment
3. N2O/O2 in Anxiety and Pain Management
   A. Pain
      1. Pain perception
      2. Pain reaction
   B. Pain Threshold
   C. Pain Control
      1. Remove cause
      2. Block pain impulses
      3. Raise pain threshold
      4. Cortical depression
      5. Psychosomatic methods
4. Pharmacology, Chemistry and Physiology of N2O/O2
   A. Physical/Chemical properties of N2O
      1. Stored as “liquid” – delivered as a gas
      2. Stored in blue cylinders
   B. Physical/Chemical properties of O2
      1. Stored as gas-delivered as a gas
      2. Stored in green cylinder
   C. Physiology of N2O/O2
      1. Depress the CNS
      2. Uptake
      3. Elimination
         a. Exhaled through lungs
         b. Diffusion hypoxia
         c. Pure O2 3-5 minutes
5. Stages of Anesthesia
   A. Stage I – Analgesia
   B. Stage II – Excitement
   C. Stage III – Surgical
   D. Stage IV – Respiratory Paralysis

6. Respiratory System Anatomy
   A. Upper Airway
      1. Nose
      2. Pharynx
   B. Lower Airway
      1. Larynx
      2. Trachea
      3. Lungs
   C. Respiratory Zone
      1. Bronchioles
      2. Alveoli – ducts and sacs

7. Characteristics of N\textsubscript{2}O/O\textsubscript{2}
   A. Nonirritating
   B. Sweet Smelling
   C. Colorless
   D. Tasteless
   E. Heavier Than Air

8. Advantages and Disadvantages of N\textsubscript{2}O/O\textsubscript{2}
   A. Advantages
      1. Onset of action
      2. Peak effect
      3. Depth of sedation
      4. Duration of action
      5. Recovery time
      6. Titration ability
      7. Discharge
      8. Safety
      9. May need no other agent
   B. Disadvantages
      1. Cost
      2. Space
      3. Not potent enough
      4. Cooperation of patient
      5. Training of staff
      6. Chronic exposure

9. Indications/Contraindications of N\textsubscript{2}O
   A. Indications
      1. Apprehension
      2. Refusal of anesthesia
      3. Allergies to anesthesia
      4. Gag reflex
      5. Heart conditions
      6. Hypertension
      7. Other
   B. Contraindications – none absolute
1. Pregnancy
2. Communication problems
3. Nasal obstruction
4. COPD
5. Emotional instability
6. Claustrophobia
7. Controlling patients

10. Positive Pressure Technique – 100% O₂
A. Emergency situations for respiratory assistance
B. Use of resuscitator valve on mask
   1. Adult and child
   2. Not an infant or small child
C. Treatment for respiratory arrest

11. N₂O Abuse/Chemical Dependency

12. N₂O Environmental Hygiene
A. Potential sources
   1. Normal gas flow
   2. Patient
   3. Unit deficiencies
   4. Air conditioners
B. Factors affecting N₂O levels
   1. Frequency of usage
   2. Size and ventilation of operatory
   3. Scavenger systems
C. Minimizing levels of N₂O
   1. Scavenger hoods
   2. Equipment leaks
   3. Ventilation
   4. Monitoring system

13. Nitrous Oxide Units
A. Cylinders (tanks)
   1. Size
   2. Color coded
   3. Safety
   4. Storage
B. Gas Machine
   1. Portable or central system
   2. Components
      a. Yokes
      b. Control valves
      c. Flow meter
      d. Pressure gauges
         1. Oxygen
         2. Nitrous oxide
      e. Reservoir bag
      f. Gas hose
C. Mask (Nasal Inhaler)
   1. Sizes
      a. Adult
      b. Child
2. Scavenger/nonscavenger
3. Material
   a. Rubber
   b. Non-latex
4. Sterilized/Disinfectant
5. Disposable
6. Nasal Liner
D. Positive Pressure Delivery

14. Safety Measures
A. Color-coded
B. Pin-indexing
C. Diameter indexing
D. Oxygen Depletion
   1. Audible alarm
   2. Automatic turnoff (fail-safe)
   3. Minimum oxygen flow
   4. O₂ flush button
   5. Scavenger system
   6. Positive pressure ventilation

15. Infection Control
A. Cleaning
B. Disinfect
C. Sterilize
D. Barriers

16. Management of Medical Problems
A. Frequency
B. Side-affects
   1. Excessive perspiration
   2. Expectoration
   3. Nausea
   4. Vomiting
   5. Behavior problems
   6. Shivering
   7. Corneal irritation
   8. Diffusion hypoxia
   9. Equipment malfunction

17. Signs and Symptoms of N₂O-O₂ Sedation
A. Signs
B. Symptoms

18. Documentation of N₂O/O₂
A. Informed Consent
B. HIPAA
   1. Privacy requirements
   2. Patients’ rights
   3. Administrative requirements
C. Patient Chart
   1. Vitals
      a. Pre-operative
      b. Post-operative
   2. Levels
3. Patients’ account
19. Anxiety and Pain Control using N₂O/O₂
   A. Pain
      1. Pain Perception
      2. Pain Reaction
   B. Factors Affecting Pain
      1. Emotional State
      2. Physical State
   C. Methods of Pain Control
      1. Remove cause
      2. Block pathway of pain impulses
      3. Raising pain threshold
      4. Cortical depression
      5. Psychosomatic methods

20. Administration of N₂O/O₂
21. Monitoring of N₂O/O₂

**COURSE OBJECTIVES:**
1. Students will explain the Minnesota Board of Dentistry rules regarding nitrous oxide inhalation analgesia.
2. Students will identify and explain the history associated with N₂O/O₂ use, stages of anesthesia, the utilization of N₂O/O₂ analgesia for anxiety and pain, and safety factors associated with the equipment.
3. Students will describe the pharmacology, chemistry and physiology of N₂O/O₂ and the anatomy of the respiratory system.
4. Students will list and describe the characteristics, indications/contraindications, and advantages/disadvantages of N₂O/O₂.
5. Students will explain and describe N₂O abuse/chemical dependency, and N₂O environmental hygiene.
6. Students will assemble N₂O/O₂ unit while utilizing infection control techniques.
7. Students will perform and monitor the administration of N₂O/O₂ analgesia.
8. Students will assess the management of medical complications associated with N₂O/O₂.

**MNTEC GOALS AND COMPETENCIES MET:**
N/A

**HCC COMPETENCIES MET:**
Working Productively & Cooperatively
Communicating Clearly & Effectively
Thinking Creatively & Critically

**STUDENT CONTRIBUTIONS:**
Each student will spend at least 2 hours per week preparing for class. Attendance is crucial in this class. The student will be expected to attend all lectures, participate in class activities, participate and implement input into class discussions, and hand in outside assignments when due.
STUDENT ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.

Curriculum Committee Approval Date: May 1, 2018

AASC APPROVAL DATE: May 9, 2018
REVIEW DATE: May 2023